

Association for Information Systems AIS Electronic Library (AISeL)

PACIS 2014 Proceedings

Pacific Asia Conference on Information Systems
(PACIS)

2014

ASSESSING THE NEW WAY OF WORKING: BRICKS, BYTES AND BEHAVIOUR

Arjan de Kok

Utrecht University, a.dekok@uu.nl

Jonas Koops

Utrecht University, j.koops@uu.nl

Remko W. Helms

Utrecht University, remko.helms@ou.nl

Follow this and additional works at: <http://aisel.aisnet.org/pacis2014>

Recommended Citation

Kok, Arjan de; Koops, Jonas; and Helms, Remko W., "ASSESSING THE NEW WAY OF WORKING: BRICKS, BYTES AND BEHAVIOUR" (2014). *PACIS 2014 Proceedings*. 7.

<http://aisel.aisnet.org/pacis2014/7>

This material is brought to you by the Pacific Asia Conference on Information Systems (PACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in PACIS 2014 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

ASSESSING THE NEW WAY OF WORKING: BRICKS, BYTES AND BEHAVIOUR

Arjan de Kok, Department of Information and Computing Sciences, Utrecht University,
Utrecht, The Netherlands, a.dekok@uu.nl

Jonas Koops, Department of Information and Computing Sciences, Utrecht University,
Utrecht, The Netherlands, j.koops@uu.nl

Remko W. Helms, Department of Information and Computing Sciences, Utrecht University,
Utrecht, The Netherlands, r.w.helms@uu.nl; Faculty of Management, Science &
Technology, Open University, Heerlen, The Netherlands, remko.helms@ou.nl

Abstract

The world in which we work is changing. Information and communication technologies transform the work environment, providing the flexibility of when and where to work. The New Way of Working (NWOW) is a relatively new phenomenon that provides the context for these developments. It consists of three distinct pillars that are referred to as Bricks, Bytes and Behaviour. These pillars formed the basis for the development of the NWOW Analysis Monitor that enables organisations to determine their current level of NWOW adoption and provides guidance for future initiatives in adopting NWOW practices. The level of adoption is determined from both the manager's and employees' perspective as they might have a different perception and/or expectations regarding NWOW. The development of the multi-level NWOW Analysis Monitor is based on the Design Science Research approach. The monitor has been evaluated in two cases, forming two iterations in the design science research cycle. It has proved to be a useful assessment tool for organisations in the process of implementing NWOW. In future research the NWOW Analysis Monitor will be used in quantitative research on the effects of the implementation of NWOW on the organisation and its performance.

Keywords: New Way of Working, NWOW Analysis Monitor, Enabling IT, Telework.

1 INTRODUCTION

1.1 The transformation of work with ICT

Work and the work environment are rapidly changing. Information and communication technologies facilitate new ways of collaboration and communication. The Internet and mobile devices provide a flexibility that enables Teleworking, or Telecommuting: working away from the office (Dimartino & Wirth, 1990; Depickere, 1999, Shin et al, 2000, Baruch, 2000, 2001). Teleworking reduces unproductive time spent in traffic, but introduces other issues such as work-life balance, as it becomes possible to work any time anywhere. Bill Gates (2005) stated: 'All of these changes are giving people new and better ways to work, but they also bring a new set of challenges: a deluge of information, constant demands on their attention, new skills to master and pressure to be ever more productive.' Starting to use all these new 'abilities' does not mean organisations will become more effective. If the organisational model is not changed together with the changed work environment, employees may become less productive instead of more. Bryan & Joyce (2007) have already stated: 'Trying to run a company in the 21st century with an organizing model designed for the 20th century places limits on how well a company performs.'

A broader context is therefore needed in which all aspects of the work environment are addressed. The New Way of Working (NWOW) is a relatively new phenomenon that builds on the experience of Teleworking, but provides a broader context in which all aspects concerning the new work environment and digital work style are addressed. This concept can be divided into three dimensions: Bricks, Bytes and Behaviour. (1) Bricks, the physical dimension, addresses all aspects of the physical work environment, (2) Bytes, the technological dimension, addresses all aspects concerning the use and application of ICT, and (3) Behaviour, the personal dimension, which addresses all aspects concerning the manager-employee relationship and the way the employee works and experiences his work. The New Way of Working is more than Teleworking or Telecommuting; besides the freedom to work in any place and at any time, NWOW embodies the redesign of offices to accommodate task-based workplaces, with concentration places and meeting places, and a result oriented way of working in which freedom and trust play an important role. Though the principles of NWOW can be applied in 'production and location based' work environments, they can best be applied in the work environment of the 'knowledge worker' (Greene & Myerson, 2011).

The New Way of Working does not go by a single definition. Bødker & Christiansen (2002) characterise 'New work' by a 'mobile, networked technology, project-managed organisation, and new office designs. The office designs are explicitly motivated by the wish to facilitate creativity, knowledge sharing and communication, carried out across a variety of settings: office, home, airports, coffee shops and cars.' Bijl (2011) defines NWOW as 'a vision for making work more effective, efficient, pleasurable and valuable for both the organisation and the individual, giving people, within limits, the space and freedom to determine how they work, where they work, when they work, what they work with and with whom they work.' In summary, Baane et al. (2010) observe four work principles in the New Way of Working: (1) Time and location free work: 'Anytime, anywhere'; (2) Steering workers towards achieving results: 'Manage your own work'; (3) Free access to and use of knowledge, experiences and ideas: 'Unlimited access and connectivity'; (4) Flexible work relations: 'My size fits me'. They add: 'These work principles give maximal freedom to employees, on the basis of mutual trust. This trust is expressed in the freedom that employees have for carrying out their work in ways, times and locations that suit them best. The employees are evaluated based on their personal or on the team contribution to the result, rather than their presence. Thus the employees can engage in a working relationship that suits them best in terms of ambition, skills, lifestyle or stage of life'. Organisations are showing a growing interest in the New Way of Working. Especially in The Netherlands, the spread and impact of NWOW has increased over the past years (Kluwer, 2011; PWC, 2011), but also other countries in North-West Europe (e.g. Denmark, Belgium) show a growing interest (Aaløkke et al, 2005, Kluwer, 2011). Lastly, multinationals such as Philips implement NWOW across the globe (Bijl, 2011).

1.2 Importance of an Analysis Monitor for NWOW

Though the principles of NWOW are not new as such, Baane et al. (2010) found that organisations that implement all four work principles of NWOW go through a transformation process, even when Telework arrangements were already in place (Bellefroid, 2012). Embarking on an implementation of NWOW is therefore not an overnight decision as many business processes will be affected by the transition, including the changes employees will face. For organisations that plan to start the transition process towards new ways of working, the knowledge on two ‘levels’ is critical: ‘Where do we stand today?’ and ‘Where do we want to be in the future?’ Without this knowledge every transition is doomed to fail as the vision of what to improve is lacking (Mettler & Rohner, 2009). The analysis of the current and desired situation, including insight in the gaps that will need to be bridged, is therefore an important ingredient for the success of the transformation towards NWOW. To enable this, an instrument for assessing the current and future level of NWOW in organisations was developed, called the ‘Analysis Monitor for the New Way of Working’, in short: the NWOW Analysis Monitor. The objective of the NWOW Analysis Monitor is to be able to perform a relatively quick overall assessment, providing the organisation with insight and focal points for additional research. The monitor should therefore be as compact as possible and easy to use, whilst still being able to give sufficient insight on the views of managers and employees on the current and desired level of NWOW adoption. It should be based on the right aspects that are affected by the NWOW implementation, and provide the right overview and balance between all these aspects. By clear reports it should provide the organisation insight on the current and future state of NWOW implementation and the gaps to be bridged. The NWOW Analysis Monitor can also be part of a larger study: in the future it will be used for quantitative research on the positive relationship between the level of adoption of NWOW and organisational performance, employee satisfaction and work-life balance. In the following chapters the development, test and evaluation process of the NWOW Analysis Monitor is discussed. Chapter 2 describes the research method, based on the Design Science Research approach. Chapter 3 describes the model development of the analysis and calculation model. In Chapter 4 the evaluation of the NWOW Analysis Monitor in a test case and live business case is discussed, followed by the conclusions and suggestions for future research.

2 RESEARCH APPROACH

As described in the introduction, organisations that plan to implement the principles of the New Way of Working need insight on where they stand to today and where they want to be in the future. The problem is that NWOW is a new concept to these organisations; this means they struggle to define their current and position and future expectations. In order to create a solution to this problem a Design Science Research (DSR) approach was chosen. DSR has attracted significant interest in the Information Systems field following the publications of Hevner et al. (2004) and Vaishnavi & Kuechler (2004). The philosophy behind DSR is that knowledge in a certain field can be generated and/or enlarged by means of constructing an artifact. At its core DSR is a problem solving process (Hevner et al, 2004). The general methodology of DSR, as proposed by Vaishnavi & Kuechler (2004), is shown in Figure 1.

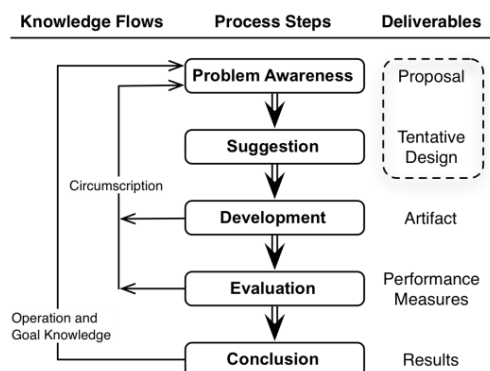


Figure 1. General methodology of Design Science Research

The DSR methodology consists of five steps, including the opportunity to iterate some of the steps if the process outcomes show areas for improvement. After becoming aware of the above problem, the (knowledge) gap was closed by researching the aspects that affect organisations implementing NWOW. These aspects were identified by performing a literature research. The artifact (i.e. the NWOW Analysis Monitor) that is designed forms a proposal for the description of NWOW. The artifact therefore needs to be developed based on the idea that the core is formed by a model that is able to describe or distinguish between the main features of NWOW. In the DSR approach the developed artifact needs to be evaluated. This was done in two cases, leading to two iterations in the design science research cycle: a test case and a live case (Yin, 2009). Figure 2 gives an overview of the development process of the NWOW Analysis Monitor, based on the DSR approach.

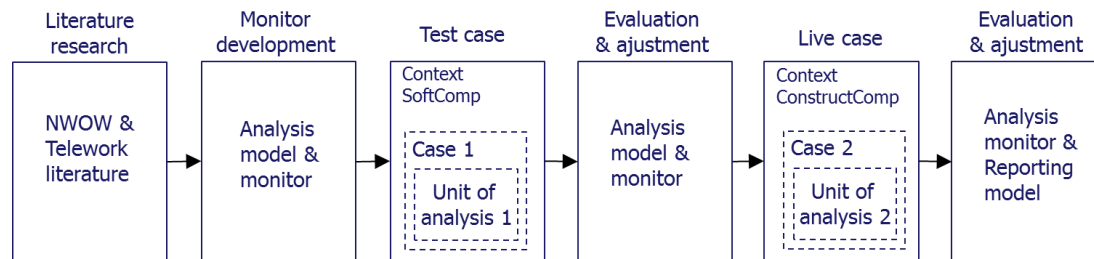


Figure 2. DSR based approach for the development of the NWOW Analysis Monitor

The literature research was used to develop an analysis model for the monitor (see next chapter). The prototype of the NWOW Analysis Monitor was developed in conjunction with SoftComp, a division of a 650 employee international software advisory and implementation company that has experience in NWOW implementations in The Netherlands. The monitor was validated in two cases. The most important evaluation criteria were completeness of the model, ease of use and usability of the results. As SoftComp itself was in the process of implementing NWOW internally, they served as the test case company for the NWOW Analysis Monitor. The test case results were evaluated and a number of adjustments were made to the monitor. Next, the monitor was used in a live business situation in a division of ConstructComp, a 3,500 employee Dutch construction company, that was in the process of implementing NWOW. The live case results were analysed and led, with some adjustments to the monitor, to the final NWOW Analysis Monitor.

3 MODEL DEVELOPMENT

3.1 Literature research and analysis model

The literature research was performed in electronic repositories, such as Emerald, Wiley Online, Mendeley, JSTOR and Google Scholar. During this research it became clear that the New Way of Working is a relative new phenomenon in scientific literature. The number of publications on NWOW is still limited, and only a few publications could be found. To obtain a more complete overview of the field, additional literature on Telework (including Telecommuting) was researched. In total 148 literature sources were analysed: 129 articles on Telework and 19 sources on NWOW. The goal of the literature research was to obtain a relevant multi-level structure of dimensions, themes and topics for the NWOW Analysis Monitor. However, in the Telework and NWOW literature such a categorisation of themes appeared to be non-existent.

Inspired by the Grounded Theory approach (Urquhart, 2001), an analysis was performed on all literature sources to obtain relevant keywords that could be categorised into themes. Additional to the reading and open coding of sources, an analysis was performed using the Nvivo analysis software. The combined analysis led to a list of 78 unique keywords that were clustered into themes. This clustering process of relevant themes was performed in conjunction with SoftComp, that has practical experience in NWOW implementations in organisations. Not all aspects that were found in literature were used in the monitor as they needed to have a relevance in relation to the implementation of NWOW. E.g. 'gender differences' is an aspect that is discussed in literature but it has no practical

relevance when determining levels of NWOW adoption prior to an implementation of NWOW in an organisation. The themes were clustered under the three dimensions: Bricks, Bytes and Behaviour. Figure 3 represents this process.

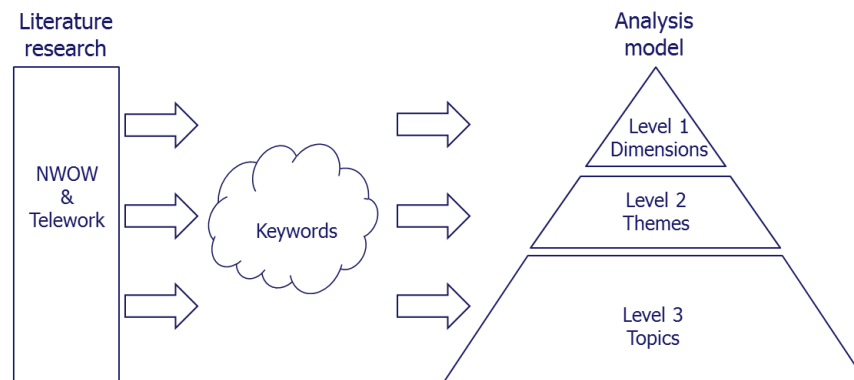


Figure 3. Literature research and multi-level analysis model

Based on the literature research, topics were defined that were grouped under the themes. The objective of these topics is to serve as a recognisable translation of the higher level theme to the employee or manager. For example, under the theme ‘Flexible work location’ one of the topics was: ‘I am allowed to determine where I want to work’ (phrasing for employees), or ‘The employees are allowed to determine where they want to work’ (phrasing for managers).

3.2 Dimensions, themes and topics

The literature research resulted in a multi-layer analysis model with dimensions, themes and topics, see also figure 3. For the top-level the previously mentioned physical, technological and personal dimensions; Bricks, Bytes and Behaviour, were used. These three dimensions are used in both NWOW and Telework literature and therefore provide a good basis for the assessment of the New Way of Working, and the framework for underlying themes and topics. The clustering of keywords derived from the Nvivo analysis, and the additional open coding, led to a total of 13 themes that were grouped under these dimensions. Table 1 gives an overview of the dimensions and their themes.

Bricks	Bytes	Behaviour
Flexible work location	Devices	Results-oriented management
Workplace design	Information availability	Results-oriented working
Sustainability & mobility	Knowledge availability	Trust & autonomy
	Communication	Satisfaction & work-life balance
	Collaboration	Culture & motivation

Table 1. Dimensions and themes

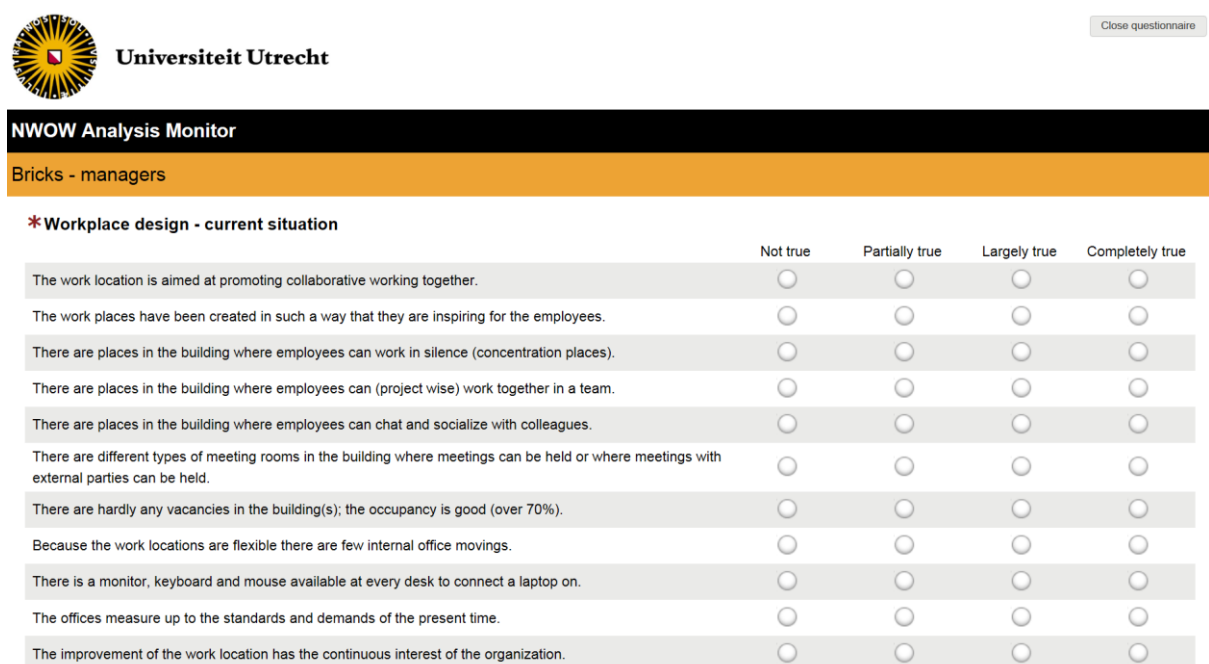
The table shows the themes that were defined for the NWOW Analysis Monitor. The themes are the main ‘axes’ on which the results of the analysis will be presented. Most themes are found under the technological and personal dimensions: Bytes and Behaviour. The themes do not need to be equally spread over the dimensions, the correct scoring and relevance is determined in the calculation model.


The next step was to define appropriate topics under the themes. Initially 114 topics were defined, divided over the various themes. This was a laborious process. The topics were defined in conjunction with SoftComp and evaluated with Microsoft Netherlands. Table 2 shows the topics under the theme Workplace design.

Theme	Topic	Weight factor
Work place design	The work location is aimed at promoting collaborative working together.	15
	The work places have been created in such a way that they are inspiring for the employees.	10
	There are places in the building where employees can work in silence (concentration places).	10
	There are places in the building where employees can (project wise) work together in a team.	10
	There are places in the building where employees can chat and socialize with colleagues.	5
	There are different types of meeting rooms in the building where meetings can be held or where meetings with external parties can be held.	5
	There are hardly any vacancies in the building(s); the occupancy is good (over 70%).	10
	Because the work locations are flexible there are few internal office movements.	10
	There is a monitor, keyboard and mouse available at every desk to connect a laptop on.	5
	The offices measure up to the standards and demands of the present time.	5
	The improvement of the work location has the continuous interest of the organisation.	15
	Total	100

Table 2. Topics with weight factors for workplace design

For the collection of analysis data a web survey was arranged with all the topics. In the survey all topics can be filled out for the current and future situation. For the conduction of the survey and the storage of data the SurveyMonkey software was used. Figure 4 shows part of the web survey for the above topics.



 Universiteit Utrecht

Close questionnaire

NWOW Analysis Monitor

Bricks - managers

***Workplace design - current situation**

	Not true	Partially true	Largely true	Completely true
The work location is aimed at promoting collaborative working together.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The work places have been created in such a way that they are inspiring for the employees.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are places in the building where employees can work in silence (concentration places).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are places in the building where employees can (project wise) work together in a team.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are places in the building where employees can chat and socialize with colleagues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are different types of meeting rooms in the building where meetings can be held or where meetings with external parties can be held.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are hardly any vacancies in the building(s); the occupancy is good (over 70%).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because the work locations are flexible there are few internal office movements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a monitor, keyboard and mouse available at every desk to connect a laptop on.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The offices measure up to the standards and demands of the present time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The improvement of the work location has the continuous interest of the organization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 4. Example monitor with topics for workplace design

Considering that topics are phrased differently for managers and employees, two separate lists of topics were created and included in the web survey. Based on the answer whether the respondent is a manager or an employee, a different list of topics is displayed.

See the following web link: https://nl.surveymonkey.com/s/NWOW_Analysis_Monitor for the complete list of topics.

3.3 Calculation model

The next step was to be able to automatically process the retrieved analysis data in the monitor to produce relevant output. Based on the multi-level analysis model a calculation model was developed. The goal of the calculation model is to present the dimensions and themes for the current and future situation in an understandable way. The chosen approach was derived from the RACE model, the Readiness Assessment model for Concurrent Engineering (Kalfan, Malik et al., 2001). In this model themes are presented along the axes of a spider diagram for the current and future situation. The advantage of this type of presentation is that in one overview a broad context can be visualised. Figure 5 gives a schematic overview of the calculation model and the results that are obtained from this model.

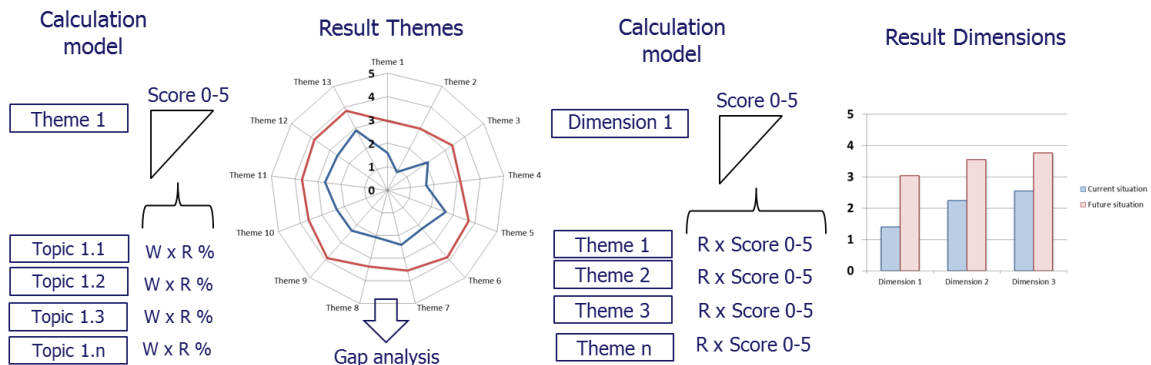


Figure 5. Overview calculation model and results

The core of the calculation model is formed by the topics; the topics determine the score for the themes and consequently the score for the dimensions. The number of topics per theme, as well as the number of themes, had to be flexible. One theme might have three topics, another one five. Also, dimensions did not need to have the same number of themes. To enable this flexibility, each topic was given a weight factor (W) that determined the relative weight of that topic for the parent theme. The total of the weight factors for all topics is always 100 points per theme. At a higher level the themes were given a relevance factor (R) to determine the relevance of that theme for the parent dimension. The total of the relevance factors is always 100% per dimension. The weight and relevance factors were pre-determined and fixed in the calculation model. For the determination of the weight and relevance factors interactive sessions were executed at the SoftComp as well as with the manager responsible for NWOW at Microsoft Netherlands. In the monitor each topic can be answered using a 4-choice (Likert type of) scale for both the current and future situation. For the current situation the choices that indicate the current state are defined in terms of applicability (true/not true), for the future situation the answer can be given in terms of importance. The choices were connected to a 4-stage rating from 0 to 100%. Figure 6 shows (an example of) the scoring model for topics.

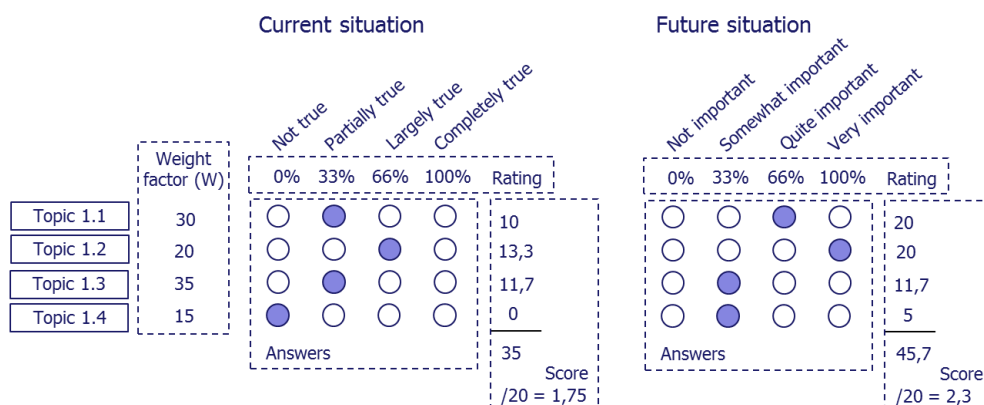


Figure 6. Scoring model (example) for topics

For the presentation of the calculated result per theme a 5-point presentation scale is used. The total score in points, in the example above 35 for the current and 45,7 for the future situation, is divided by 20 to produce the 5-point score. The calculated results are presented in a spider diagram. For the gap analysis the results can be presented as a table showing the (top) gaps for themes and topics. Figure 7 shows the scoring model for the themes. As mentioned before a pre-determined relevance factor (R) was attributed to the themes, based on their relevance or (relative) importance of the theme for the dimension.

	Current situation			Future situation	
	Relevance factor (R)	Score themes	Score dimension	Score themes	Score dimension
Theme 1	35 %	1,75	0,61	2,3	0,81
Theme 2	40 %	2,05	0,82	2,55	1
Theme 3	25 %	1,35	0,34	1,85	0,46
		1,77			2,27

Figure 7. Scoring model (example) for themes

The result is again a 5-point scale that is presented as a bar chart (see right part of figure 5).

The calculation model in the NWOW Analysis Monitor was designed to support both the combined and separate analyses of the results of managers and employees on all levels (dimensions, themes, and topics). The presentation on the level of dimensions and themes leads to different bar charts and spider diagrams (see figure 5 and the next chapter).

Inspired by the INK-managementmodel for the assessment of organisational maturity (Hardjono & Bakker, 2002) a gap analysis was developed, based on the differences in the scoring of the topics. The analysis result is presented in the form of a top-10 list of the topics with the largest gaps between the current and future situation (top-10 list is not shown here). This list can be generated for both the overall results as well as for the managers and employees separately. By comparing the two separate top-10 lists the differences between the topics managers and employees can be analysed showing the most important ones to be improved. The differences can be discussed and researched and become focal points in the coming implementation of NWOW.

The calculation model for managers and employees is similar, in order to be able to combine overall results. In this way the NWOW Analysis Monitor can support both the combined and the separate results of the managers and employees by taking the average of the overall outcomes. In the next chapter the advantage of having combined and separate scores for managers and employees will be shown and discussed.

4 EVALUATION OF THE NWOW ANALYSIS MONITOR

4.1 Test case results

The first case, the test case, was executed at SoftComp. This company supported the development of the NWOW Analysis Monitor based on their experience in NWOW implementations, but was also in the process towards (re)implementing the New Way of Working internally in their own organisation. In the past, SoftComp already started a NWOW implementation, but because of the financial crisis this initiative was stopped in 2008. Mid 2012 a new team was formed to re-initiate the implementation of NWOW. The monitor was filled out by 16 people: 3 managers and 13 employees.

In the section below some of the results of the NWOW Analysis monitor will be shown and discussed. Due to space limitations not all results, for example the gap analysis, can be shown.

Figure 8 shows the overall result for Bricks, Bytes and Behaviour at the level of dimensions.

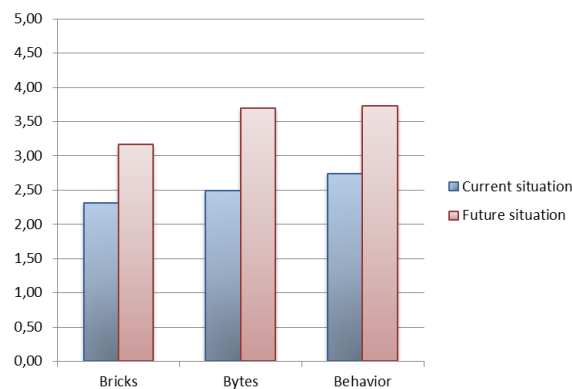


Figure 8. Test case results for dimensions

The figure shows that the initial (current situation) level for Bricks, Bytes and Behaviour is not very low: 2.5 on a 5-point scale. It should be expected that an organisation has some initial level of NWOW adoption, but the level of 50% is relatively high. The explanation for this could be the partial former NWOW implementation that was already performed in the past. SoftComp expects to make another step in the re-implementation of NWOW. The overall result for the dimensions shows they desire to make the biggest step for the dimension Bytes (1.2 point).

Figure 9 shows the overall score of the themes in the current and future situation (managers and employees combined). The coloured areas in the graph show the themes belonging to the same dimension.

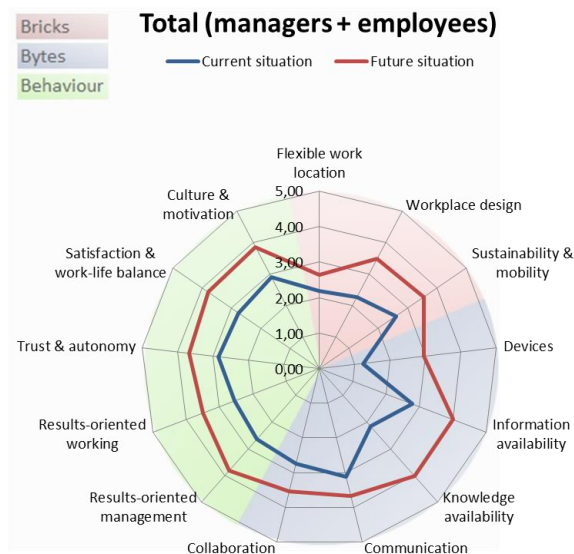


Figure 9. Test case results for themes

The figure shows that the largest gaps are in knowledge availability (1.85), devices (1.73) and workplace design (1.22). Overall, the smallest gaps are in the themes of behaviour.

In the discussion of the results the management recognised the gap for devices, as the majority of employees work on old laptops and (smart)phones. The big gap in knowledge availability meant a special focus was needed in the implementation on NWOW on making knowledge available to employees by using databases, enabling knowledge sharing between employees, and improving access to knowledge. The gap in workplace design signalled the need for attention to be paid to the right design of the workspace environment in the new situation.

The NWOW Analysis Monitor can also differentiate between the managers and employees. Figure 10 shows the result for the current situation for the managers and employees.

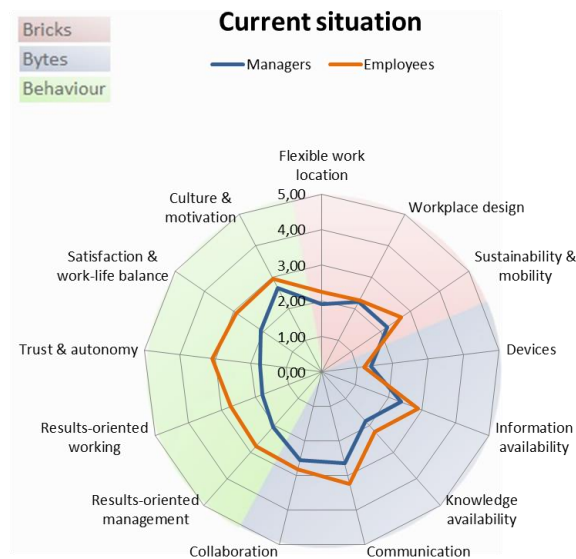


Figure 10. Test case results for managers and employees in current situation

Interestingly, figure 10 shows that the managers are more negative about the current situation than the employees, especially for the themes in behaviour. For instance, the theme trust & autonomy scores 1.75 for the managers, but 3.0 for the employees. This is a positive message for the management; their employees are more positive about their (current) freedom and autonomy. There is therefore a difference in perception. For the future situation (figure not shown) the score is about the same for managers and employees, so the expectations on the future adoption level of NWOW are roughly equal. The view on the current state of devices is equally low for managers and employees, as discussed before because of the old devices in use.

In the gap analysis for the topics the separate top-10 lists for managers and employees (tables not shown here) showed there were only three corresponding topics in the top-10. This meant the expectations on the level of themes (see figure 10) may seem quite similar, but on the underlying topics there were significant differences. It was discussed that this result justified a further detailed study of the actual expectations of managers and employees for NWOW at SoftComp.

4.2 Evaluation of the test case

In the Design Science Research approach the artifact (i.e. the NWOW Analysis Monitor) needs to be evaluated. The evaluation criteria for the NWOW Analysis Monitor were completeness of the model, ease of use, and usability of results.

The main criticism of the monitor, as used in the test case, was that it took too much time to fill out the questionnaire. In total 114 topics had to be filled out for both the current and future situation, which means at least 228 choices and mouse clicks, besides from the general questions. The respondents were asked to measure the time taken by filling out the monitor. The average time needed was 27 minutes, too long in the view of many respondents. This criticism was taken very seriously. In several sessions including a session with the manager of NWOW implementations at Microsoft Netherlands, the number of topics was reduced. This was done by critically reviewing all topics for each theme with the following questions: 'Is this topic distinctive enough?', 'Are there redundant topics?', 'Isn't the topic actually asking the same question as another topic in another way?', 'Is there causality between topics?' i.e. Does fulfilling one topic automatically lead to the answer of another topic?, and 'Can two topics be combined or rephrased to become one topic?' The result of these sessions was that the total number of topics was reduced from 114 to 77. The average time to fill in the monitor dropped to below 20 minutes, which was regarded as acceptable.

Another remark was that some respondents would like the option: Not Applicable or 'I don't know'. This remark was not incorporated in the monitor, as this would make the calculation model much more complex. The calculation model would need to support the re-calculation of remaining filled-in topics per theme if a respondent would answer N.A. on one or more topics. As the total weight factor of topics per theme was predefined and fixed at 100 points, a re-calculation would need to take place, as one or more topics were not applicable (0). To obtain the same balance between themes as before the weight factor of the remaining topics would need to be increased to result in a 100 point total again. If N.A. were an option for all questions many re-calculations could be needed. In theory it could even be impossible to recalculate to a total of 100 points, when all topics under a theme were considered not applicable by a respondent. This would result in possible instability of the monitor (divided by 0). It was decided to add an explanation to the monitor, explaining the meaning of the themes and topics to the respondent, to help answering the topic that were not clear to the respondent.

The completeness of the model and usability of the results of the NWOW Analysis Monitor was perceived as good. A number of the results were recognised and appealed to the management, especially the gap analysis gave ground to debate.

4.3 Live case results

The second case was performed at a division of a 3,500 employee construction company (ConstructComp). At the end of 2012 the division was in the process of starting their first NWOW implementation, with the intention to roll NWOW out to other divisions at a later stage. All employees and managers of the division, in total 250 persons, received an e-mail explaining the NWOW Analysis Monitor, and asking them to participate. In total 66 respondents filled out the survey: 11 managers and 55 employees. Figure 11 shows the overall results at the level of dimensions.

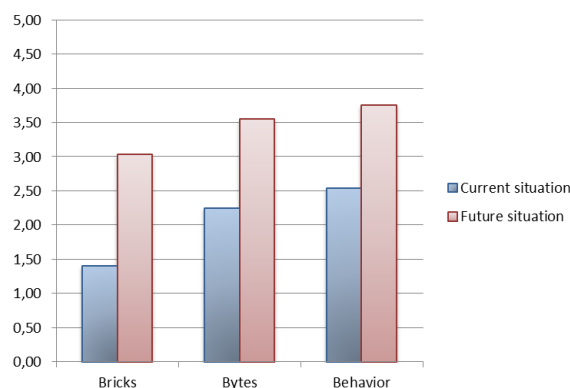


Figure 11. Live case results for dimensions

It is interesting to see that the score for the current situation is lower here than in the test case. This supports the idea that the partial pre-implementation of NWOW in the past at SoftComp may indeed have led to a higher initial score for the level of NWOW adoption in the current situation. The biggest gap is for Bricks; the respondents expect the largest shift in the actual physical change of the work environment.

Figure 12 shows the overall score for all themes in the current and future situation.

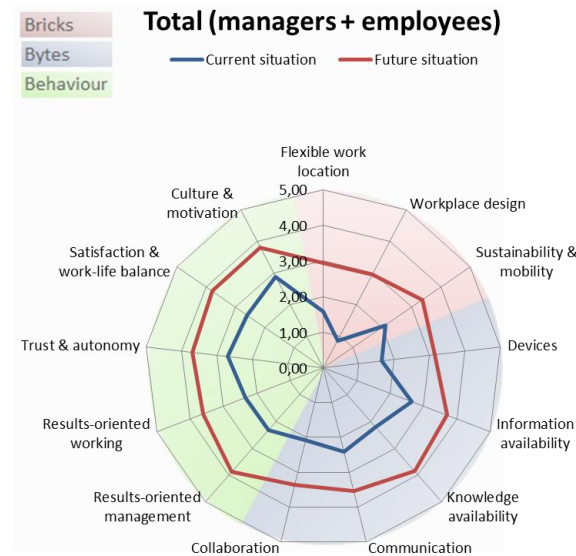


Figure 12. Live case results for themes

The largest gap is for workplace design (2.1), followed by knowledge availability (1.64) and result oriented management (1.56). Managers and employees clearly expect NWOW to have a large impact on their work environment. It is interesting to see that the theme knowledge availability was also a large gap in the test company. Having better access to all available knowledge in the future appears to be an important expectation in organisations. Result oriented working is one of the core organisational principles of the New Way of Working. At ConstructComp both managers and employees (figures not shown) expect to make a large step in the area of improving result oriented working.

It is also interesting to see that, when comparing the responses of managers and employees for the current situation (figure not shown), the employees are again somewhat more positive than the managers on a number of themes for the dimension Behaviour. However, the difference is smaller than in the test case. The employees are more motivated and satisfied with their work and enjoy a higher level of trust in the current situation than managers think they do. For the future situation the picture is again quite similar for managers and employees.

In the top-10 lists of topics with the largest gap between the current and future situation for managers and employees (not shown) there were seven corresponding topics. This means the perception of the current situation and the future expectations of managers and employees in this case (ConstructComp) are more aligned than in the test case (SoftComp).

4.4 Evaluation of the live case

The adjustments made to the NWOW Analysis Monitor proved to be effective. The main previous criticism that it took too much time to fill out the monitor was not brought up again. Although the participants were not asked to measure the time involved, the general perception was that it was not too extensive. In fact, there were no major points of criticism in the live case. The question for a N.A. or 'I don't know' option was however raised again, although the themes and topics were explained in the introduction to the monitor and an accompanying guide was provided.

The (new) major shortcoming of the monitor in the live case appeared to be a good reporting mechanism. In the test case all results were still collected by hand, but in the live case many employees and managers asked for a report with the results of their own individual input in the monitor. This led to the development of a reporting tool, in which both the individual and total results could be automatically generated, printed and supplied (in pdf).

The NWOW implementation team and the management of ConstructComp were very satisfied with the results. It helped them gain more specific insight in the expectations of managers and employees for NWOW. The analysis report with the overall results was spread among all 250 employees of the division of ConstructComp.

5 CONCLUSIONS AND FUTURE RESEARCH

In an ever changing world, where information technologies and new ways of working transform the work environment, organisations struggle to find the right strategy to cope with these developments. Having insight in the current situation and the desired future situation enables organisations to focus on their approach of implementing the New Way of Working.

The NWOW Analysis Monitor was developed to enable organisations to assess their current level of NWOW adoption and provide guidance for future initiatives in adopting NWOW practices. The NWOW Analysis Monitor is based on the three pillars of NWOW: Bricks, Bytes and Behaviour, thus providing a balanced overview of all aspects concerning the physical work environment, technological developments and the manager-employee relationship. The Design Science Research (DSR) approach was used to develop the monitor, using two cases as iterations in the design science research cycle. Based on the case studies the questionnaire was shortened and a reporting mechanism was added. In this way the monitor became a broad and usable analysis instrument.

The research of 148 literature sources on Telework and NWOW led to a multi-level analysis model with 13 themes clustered under the three above dimensions of NWOW. Under these themes 77 topics were defined to provide a broad analysis of all aspects concerning NWOW. The defined multi-level categorisation of the NWOW Analysis Monitor is an addition to the literature in this field, as no existing categorisation was found. It might also be useful for other scientific research in the area of Telework and NWOW.

The gap analysis between the current and future situation, and the possibility of evaluating the different perspectives of managers and employees, has proven its practical usefulness for the involved organisations. The NWOW Analysis Monitor therefore fills a void in lacking knowledge for organisations on how to position themselves in the current adoption level of NWOW and how to approach future expectations with regard to NWOW.

Besides the practical contribution as a useful assessment tool for organisations, there is also a scientific contribution. The NWOW Analysis Monitor will serve as a measuring instrument for future quantitative research on the effects of the implementation of NWOW on the organisation and its performance. This research could support or reject the positive relationship that is claimed in practitioner literature on the effects of the adoption of NWOW on employee satisfaction and work-life balance.

References

- Aaløkke, S., Bjerrum, E., Bødker, S., & Petersen, A. B. (2005). Gate Keeping or Bridge Building? - Cooperation, Learning and Boundary Working in a Cross Media Workplace. Alexandra Institute. Retrieved from http://www.alexandra.dk/dk/labs/documents/nwow/nwow_olkc.pdf
- Baane R., Houtkamp P., & Knotter M. (2010). The new world of work unravelled – Het nieuwe werken ontrafeld – over Bricks, Bytes & Behavior. 1-168. Koninklijke Van Gorcum BV. ISBN 9789023245858.
- Baruch, Y. (2000). Teleworking : Benefits and pitfalls as perceived by professionals and managers. *New Technology, Work and Employment*, 15(1), 34-49.
- Baruch, Y. (2001). The status of research on teleworking and an agenda for future research. *International Journal of Management Reviews*, 3(2), 113–129. doi:10.1111/1468-2370.00058
- Bellefroid, B. (2012). The new way of knowledge sharing. A thesis research about the effects of NWOW on knowledge sharing. Utrecht University.
- Bijl, D. W. (2011). Journey towards the New Way of Working - creating sustainable performance and joy at work. Par CC. ISBN: 978-94-90528-00-3
- Bødker, S., & Christiansen, E. (2002). Lost and Found in Flexibility. University of Aarhus, Center for New Ways of Working. Retrieved from [http://pure.au.dk/portal/en/publications/lost-and-found-in-flexibility\(cd3361c0-983b-11da-bee9-02004c4f4f50\).html](http://pure.au.dk/portal/en/publications/lost-and-found-in-flexibility(cd3361c0-983b-11da-bee9-02004c4f4f50).html)
- Bryan, L.L. & Joyce, C.I. (2007). Mobilizing Minds: Creating Wealth from Talent in the 21st-Century Organization. New Jersey, USA: McGraw-Hill Education.
- Depickere, A. (1999). Managing Virtual Working. Between Commitment and Control?, in Jackson, P. (ed.), *Virtual Working: Social and Organisational Dynamics*, Routledge, London.
- DiMartino V. & Wirth L. (1990). Telework: a new way of working and living. *International Labour Review* 129: 529– 554.
- Gates, B. (2005). The New World of Work. Microsoft Executive Briefing, Retrieved from <http://www.microsoft.com/mscorp/execmail/2005/05-19newworldofwork.mspx>
- Greene, C., & Myerson, J. (2011). Space for thought: designing for knowledge workers. *Facilities*, 29(1/2), 19-30.
- Hardjono, T.W. & Bakker, R.J.M. (2002) Management van processen: identificeren, besturen, beheersen en vernieuwen. INK-managementmodel. ISBN, 9014096070. Kluwer.
- Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design Science in Information Systems Research. *MIS Quarterly*, 28(1), 75-105.
- Khalfan, Malik, et al. "Readiness Assessment of the construction supply chain for Concurrent Engineering." *European Journal of Purchasing & Supply Management* 7.2 (2001): 141-153.
- Kluwer. (2011). National Investigation on the New Way of Working - Nationaal Onderzoek Over Het Nieuwe Werken (pp. 1-81). Kluwer Publishing. Retrieved from <http://overhetnieuwewerken.nl/whitepapers/nationaal-onderzoek-over-het-nieuwe-werken-2011>
- Mettler, T., & Rohner, P. (2009). Situational maturity models as instrumental artifacts for organizational design. *Proceedings of the 4th International Conference on Design Science Research in Information Systems and Technology* (p. 22). ACM.
- PWC. (2011). A macro-economic survey for the effects of The New Way of Working - Een verkenning van macro-economische effecten van Het Nieuwe Werken. PricewaterhouseCoopers Accountants N.V.
- Shin, B., El Sawy, O.A., Liu Sheng, O.R. and Higa, K. (2000). Telework: Existing Research and Future Directions. *Journal of Organizational Computing and Electronic Commerce*, Vol. 10, No. 2, pp. 85-101.
- Urquhart, C. (2001). An Encounter with Grounded Theory : Tackling the Practical and Philosophical Issues. University of the Sunshine Coast, Queensland, Australia.
- Vaishnavi, V., & Keuchler, W. (2004). Design Research in Information Systems. Retrieved 25 November 2011, from Association for Information Systems: <http://home.aisnet.org/displaycommon.cfm?an=1&subarticlenbr=279>
- Yin, R.K. (2009). Case Study Research. Thousand Oaks, California, USA, Sage Publications.